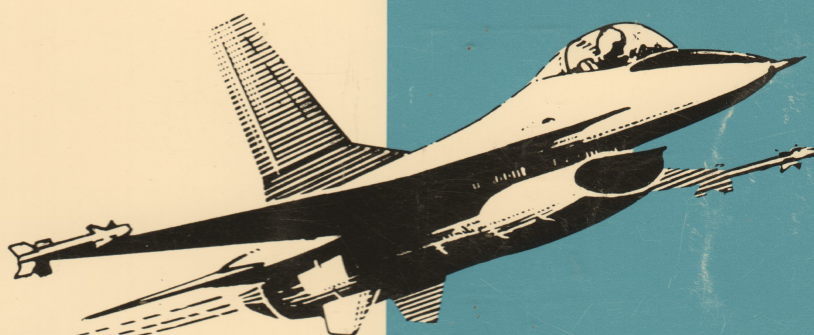


TF16Z-09

TF16Z-09

F-16



TRAINING MANUAL

FUEL TANK SEALING

OCTOBER 1986

**A MESSAGE FROM C. N. WHITE,
VICE PRESIDENT - PRODUCTION
GENERAL DYNAMICS FORT WORTH DIVISION**

One of the most exasperating experiences in the aerospace field is having a scheduled mission aborted due to a fuel leak.

We at General Dynamics Fort Worth are making every attempt to assure that each phase of sealing F-16 fuel tanks is performed by qualified personnel, in excellent facilities, and with quality materials.

The most important ingredient, however, is . . . **YOU!**

Your attitudes and skills will assure **ZERO** fuel leaks on the Free World's foremost weapon system.

C. N. White

SEALANT INJECTION GUN
SEMCO MODEL
PD 4104

A high pressure, volume controlled one shot gun used to fill voids where injection is required. The type and size of the tip used depend upon the particular application.

SEALANT FILLETING GUN
SEMCO MODEL NO. 250-05
OR EQUIVALENT

A low pressure, constant flow gun which is used in most applications of sealant to fill external voids and to apply sealant to joining surfaces.

Acid Brushes

Spatulas

TRAINING MANUAL NO. TF16Z-09
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OCTOBER 1986

GENERAL DYNAMICS
Fort Worth Division

NOTE:

SEALING
FUEL TANK
If you have any questions or need more information, please contact the Engineering Department at the Engineering Department.

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TECHNICAL TRAINING DEPARTMENT

OCTOBER 1966

GENERAL DYNAMICS
Fort Worth Division

DEFINITIONS OF TERMS

Term	Definition
Application Time or Work Life	The length of time that sealant can be used after it is mixed.
Boundary Structure	The basic structure is a fuel tank that forms the tank boundaries.

FOREWORD

This booklet is a handy source of condensed information on the materials and methods used to seal the F-16 integral fuel tanks. This information is for reference only. Engineering releases (drawings, specifications, etc.) and Process Standards are the official sources of information. Effective fuel tank sealing depends upon skill and knowledge. Improving your ability helps increase the reliability of the product.

Remember . . . Keep the surfaces clean.

DO IT RIGHT THE FIRST TIME



DEFINITIONS OF TERMS

Term	Definition
Permanent Fasteners	The fasteners that are called out on blue prints and that remain in the assembly.
Preliminary Air Test	A test check on the assembly before it is subjected to a final test.
Set-Up Bolt	Keep the surface clean.
Torquing Fastener	Fastener which is tightened to a specified torque.
Retorquing Fasteners	Fasteners which are tightened to a specified torque after they have been in service for a period of time.
Void	A cavity or hole in a material.
Open Void	A void which is exposed to the atmosphere.
Closed Void	A void which is not exposed to the atmosphere.

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Figure 13 DISPOSE OF USED CLEANING RAGS ONLY
IN CONTAINER MARKED "RAG BARREL"

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APPLICABLE DOCUMENTS

FPS 1004	Sealing Specifications, Integral Fuel Tanks
FPS 3035	Process and Quality Control Adhesively Sealed Integral Fuel Tank Applications
FMS 1044	Sealant, General — F-16
P6217	Sealant — Integral Fuel Tank — High Temperature Resistant
MIL-C-27725	Coating, Integral Fuel Tank Corrosion Protection
P6140	Adhesion Promoter Standard
FPS-3012	Repair of F-16 Fuel Leaks
FPS-3058	Repair of F-16 Adhesively Sealed Fuel Tanks
16AEI-46-1017	Air Testing F-16 Wing and Fuselage Fuel Tanks
16AEI-46-1008	Pressure Test, F-16 Fuel System
16AEI-46-1009	Purging Procedure F-16 Fuel Tanks
M219	Sealant and Prime Application — Fastener Installation
PS 42.01	Control of Sealants, Adhesives, and Potting Compounds
PS 74.01-84	Primer, Integral Fuel Tank
FMS 1058-1	Primer Used as Adhesion Promoter on Cadmium Steel Plated Fasteners
P5396	Cleaning Cloth
P6228	Cleaner, Solvent, MIL-C-38736 Alternate
FMS 3014	Nitrile — Phenolic Adhesive, Elevated Temperature Curing Application in Integral Fuel Tank
C9714	Seal Washer

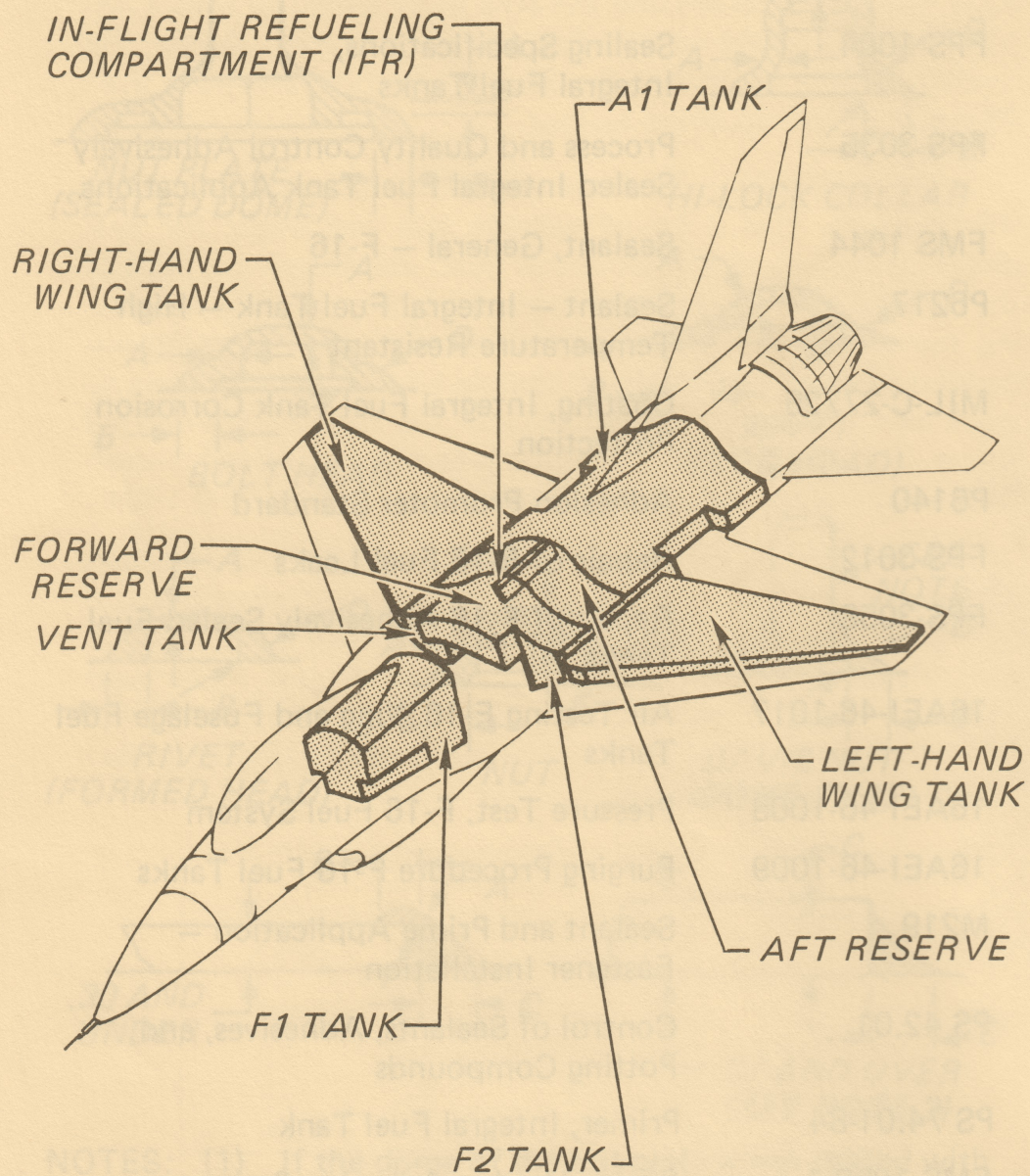


Figure 1 LOCATION OF F-16 FUEL RESERVOIRS

F-16 FUEL TANKS

The F-16 aircraft carries 1066 gallons of highly flammable JP-4 fuel in its integral fuel tanks. This fuel capacity gives the aircraft a combat range of 500 miles and an unrefueled ferry range of over 2500 miles.

All the F-16's impressive flight characteristics, its unique fly-by-wire flight controls, its powerful engine, and its ability to outmaneuver other aircraft can all be useless if the fuel does not stay in the fuel tanks . . . **aircraft don't fly with fuel leaks.**

If we could strip the outer covering from the F-16 and look inside, we would find that the majority of the aircraft's space is used for fuel. There are three integral fuel tanks in the fuselage and one in each wing.

The term "integral fuel tank" means that the basic structure is used to form the fuel tank. Therefore, the parts used in the construction must be fully sealed at the faying surfaces and around voids and fasteners.

The method used for sealing the integral fuel tanks consists of sealing the faying surfaces during assembly with an approved adhesive or sealant, installing all fasteners with wet primer or sealant, and applying sealing fillets over all seams and fasteners. This creates a multiple barrier system with each barrier contributing toward an effectively sealed tank. The most important barrier — the one on which the remainder of the system is dependent — is the seal at the faying surfaces of the structure. This is the foundation of the complete system and sealing must be accomplished correctly during assembly.

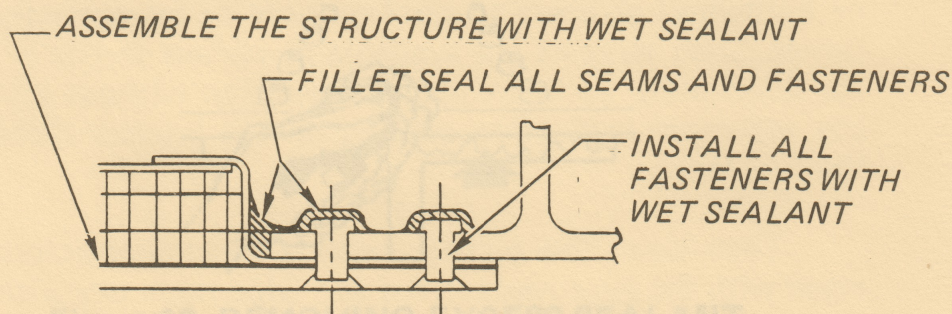


Figure 2 MULTIPLE BARRIER SEAL

F-16 FUEL TANKS

The F-16's fuel tanks are 1000 gallons of highly flammable JP-4 fuel. This fuel is highly volatile and gives the aircraft a combat range of 500 miles and an unrefueled ferry range of over 2500 miles.

All the F-16's important flight characteristics, its unique fly-by-wire flight controls, its powerful engines and its ability to outmaneuver other aircraft can all be achieved if the fuel does not leak from the fuel tanks. Aircraft don't fly with fuel leaks.

The F-16's fuel tanks are located in the outer covering of the fuselage. The fuel tanks are located in the outer covering of the fuselage. The fuel tanks are located in the outer covering of the fuselage. The fuel tanks are located in the outer covering of the fuselage.

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SEALANT MATERIALS

The materials, equipment, and procedures for sealing the F-16 integral fuel tanks are governed by FPS 3035 and FPS 1004F Vol. 1. These specifications state that sealant materials must be qualified according to FMS-1044-5, FMS-3014, and P.S. 42.01-118.

These documents describe the required characteristics of sealants and provide testing processes and procedures to assure qualification.

Sealant material is shipped by temperature-controlled transportation, and, upon receipt, is placed in temperature-controlled storage to await tests. At this time, the material is controlled by P.S. 42.01, which sets forth the requirements for receiving, storing, mixing, and issuing sealants and adhesives. The specific instruction data sheet for Pro Seal 899 is P.S. 42.01-9; for PR1750, it is P.S. 42.01-112.

The sealant is a polysulfide sealant containing certain additives used to extend or modify the properties of the material. It is a two-part material (base and accelerator) that is mixed prior to use. A base and accelerator is shipped as a unit known as a "kit." A kit is a matched base and accelerator in a preweighed ratio of 10:1. After mixing, it may be stored at -20°F for 30 days (maximum), then thawed when ready to use.

After the material has passed certain receiving tests and been approved by Process Control, it is released for production use. It is then kept in the warehouse under controlled temperature storage.

Upon withdrawal, it is delivered to the Central Sealant Mixing Crib, where trained certified personnel mix and log the kits.

The mixing instructions are explicit, and every batch is given a mixing check regardless of the mixing method used — hand, mechanical, or automatic. After mixing, the sealant is placed in prelabeled tubes.

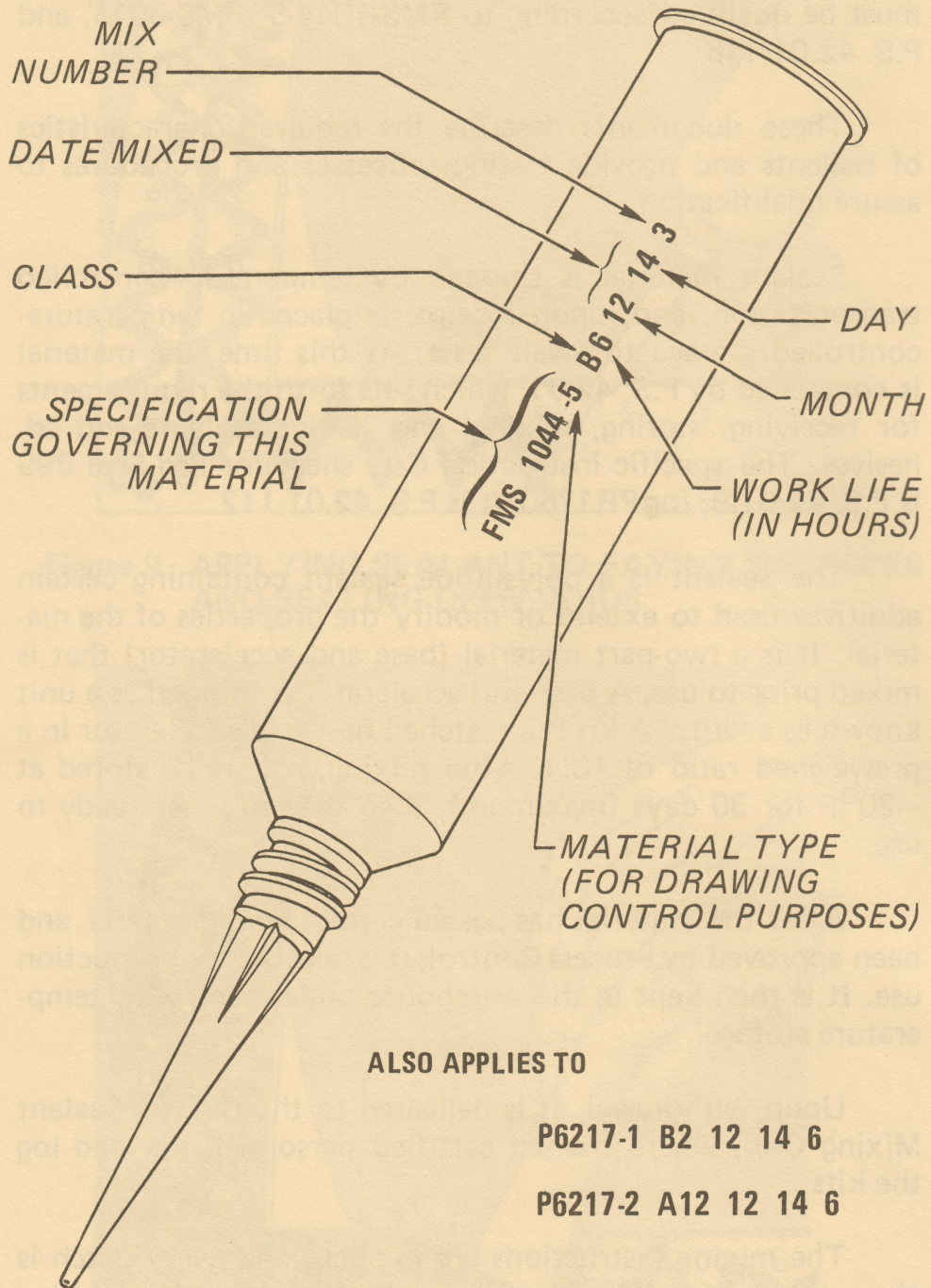


Figure 3 THE SEALANT TUBE

Sealant Labeling

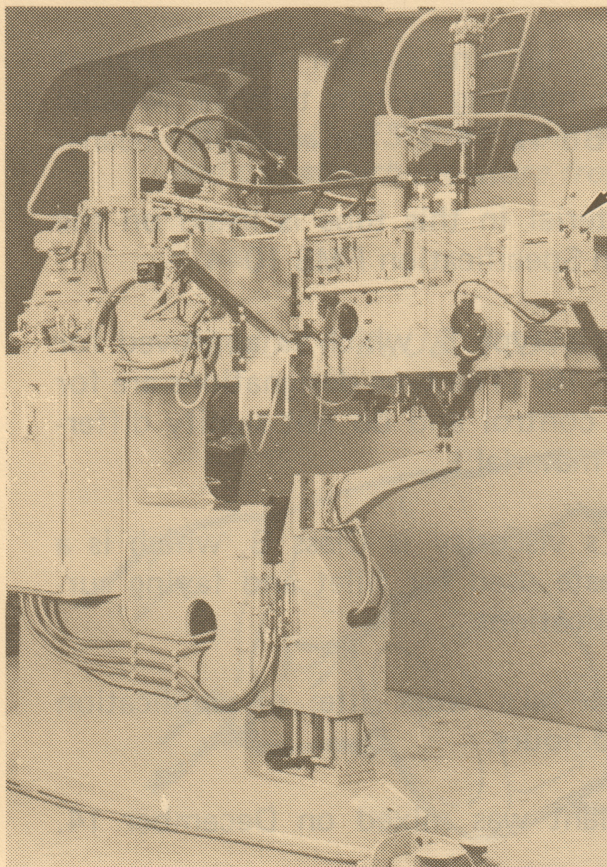
Now, let's look at the labeling system used on sealant tubes and see what the numbering system tells us. A label that reads "FMS 1044-5 B6 12 14 3," for example, means:

- | | |
|----------|--|
| FMS 1044 | The material in this tube is listed on the FQML in Specification FMS 1044. |
| -5 | Material is type 5, which is approved for use on F-16. (The type designations are for drawing control and do not signify differences in material.) |
| B | Material's viscosity is Class B, which is a thick paste used for fillet and faying surface applications. |
| 6 | The material's work life, or application time, is 6 hours. |
| 12 14 | The sealant was mixed on December 14. |
| 3 | The material was the third batch, or mix, prepared on the date listed. The mix is logged at the Central Sealant Mixing Crib. |

A label reading "P6217-2 A12 12 14 6" is interpreted in the same way. Specifications for this material can be found in P.S. 42.01-118.

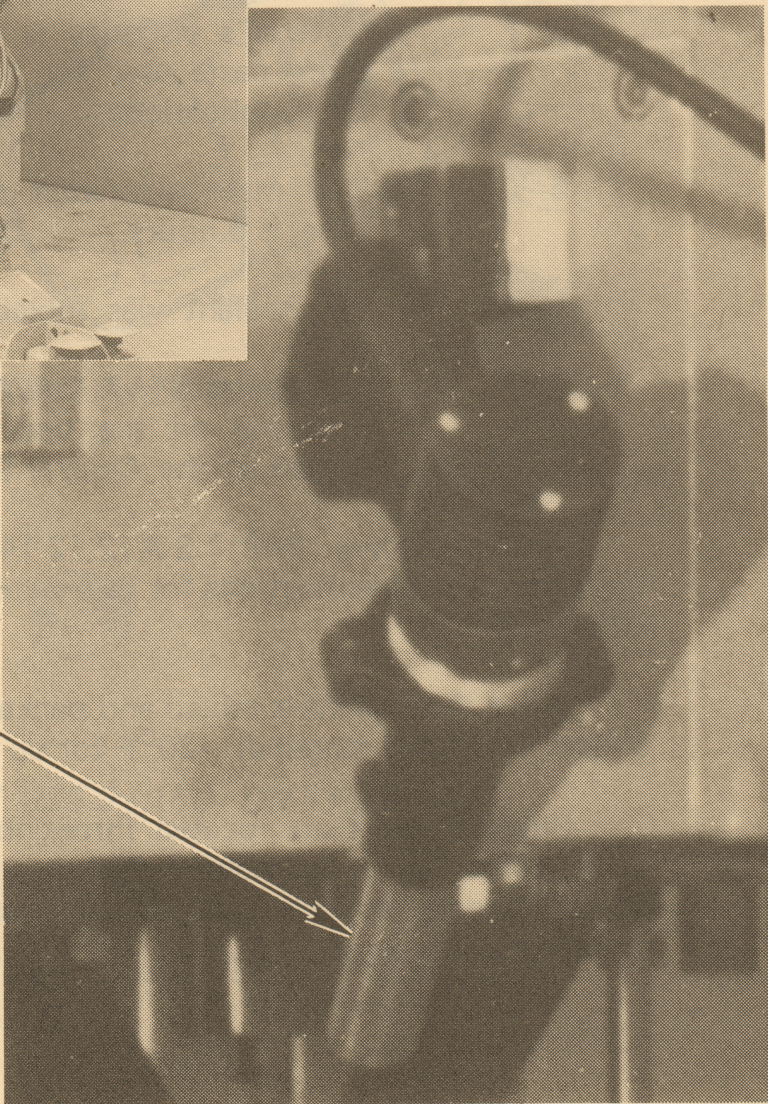
After the sealant is mixed and packaged in the 6-oz. cartridges, it may be stored at -20°F for up to 30 days.

Small freezers are located throughout the factory and daily restocking is maintained. Before using sealant, always check the date on each tube for compliance with the 30-day storage requirements.



SEALANT
INJECT SWITCH

SEALANT TUBE
ADAPTER



**Figure 4 GEMCOR AUTOMATIC RIVETER AND
CLOSEUP OF HEAD DETAIL SHOWING
SEALANT APPLICATOR**

While all sealant material furnished to the shop conforms to General Dynamics specifications, you may select the class and work life. You will also need to determine if the sealant is to be used in the adhesive seal procedure.

Sealant is available in three classes:

Class A is a thin brushable material designed for repairs and for fillet on fasteners.

Class B is a thick paste material, commonly referred to as a general sealant, designed for faying surfaces and for filleting.

Class C is a medium viscosity material designed for use in automatic riveting machines.

Pro Seal 880 (designated as P6217 by General Dynamics) comes in only two classes. Class ~~B~~^A, designated P6217-1, has a ~~12-hour~~ work life and is suitable for use in automatic riveters. Class ~~B~~^A, designated P6217-2, is a ~~two hour~~ ^{12 hour} work life material.

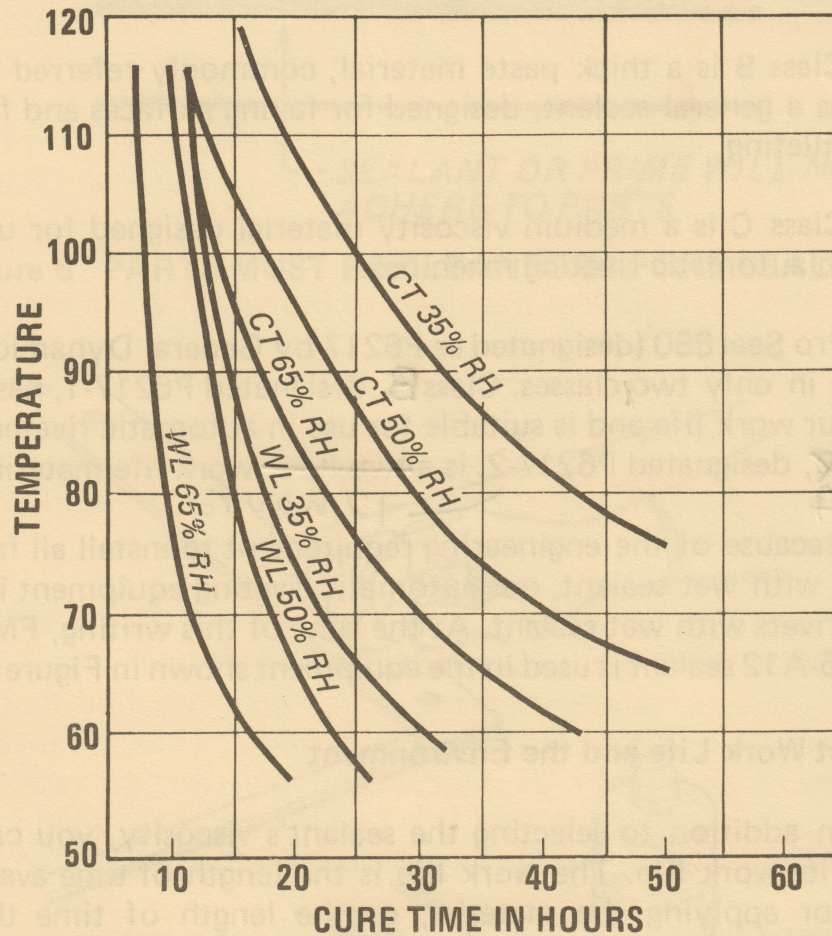
Because of the engineering requirement to install all fasteners with wet sealant, our automatic riveting equipment installs rivets with wet sealant. At the time of this writing, FMS 1044-5-A12 sealant is used in the equipment shown in Figure 4.

Sealant Work Life and the Environment

In addition to selecting the sealant's viscosity, you can select its work life. The work life is the length of time available for applying the material, or the length of time the material is workable, before it becomes tacky.

When choosing sealant for faying surfaces, it is important to choose a work life that allows sufficient time for pulling the surfaces together with set-up bolts and for installing the permanent fasteners. This must be done during the sealant's work life to assure good sealing.

This sealant is a reactive chemical. To judge the properties and characteristics of chemicals, they must be compared against results at a given condition. The standard condition



RH = RELATIVE HUMIDITY
 CT = CURE TIME
 WL = WORK LIFE

Proseal 889-B2
 (FMS-1044-B2)

Figure 5 EFFECTS OF TEMPERATURE & HUMIDITY ON WORK LIFE AND CURE TIME

for FMS 1044 sealant is 77°F temperature and 50% relative humidity. **Variation of either temperature or humidity will alter the work life and cure time of the sealant.** The work life shown on the sealant tube is for the standard condition.

The chemicals contained in FMS 1044 react at different rates depending upon the temperature at which they are combined. For example, a B2 material would have a 2-hour work life at standard conditions of 77°F and 50% humidity. However, if the temperature were reduced to 60°F and the relative humidity remained the same (50%), the B2 would act like a B3. If the temperature were increased to 90°F and again the relative humidity remained the same (50%), only a 1-hour work life could be expected from the same material. Changes in temperature dramatically affect the work life.

Now, let's look at the effect of humidity. When the catalyst is combined with the base to cause the polymer chain to grow and form the cured rubber, the reaction can be accelerated by the presence of moisture. As you know, moisture is present in the air, and the concentration of moisture varies dramatically with the time of year, with the location in the United States, and even with the time of day.

At 77°F, if the relative humidity is reduced to 35%, we find that the 2-hour material acts like a 3-hour material. If the relative humidity is increased to 65%, we find that the 2-hour material acts like a 1-hour material. Thus, we must be aware of the effect of moisture on the reaction rate. The change is so dramatic that it is not a subject that can be ignored in planning the output of work on the production line.

The chart indicates the effects of temperature and humidity of sealant work life and cure time. Temperatures of 60°F, 77°F, and 90°F were used with relative humidities of 35%, 50% and 65% to demonstrate the significance of atmospheric conditions. Each condition change caused a work life and cure time change of about 50%. You can understand that it is important for supervision to be aware of the temperatures and humidities that are prevalent in the shop during times when sealant is in use.

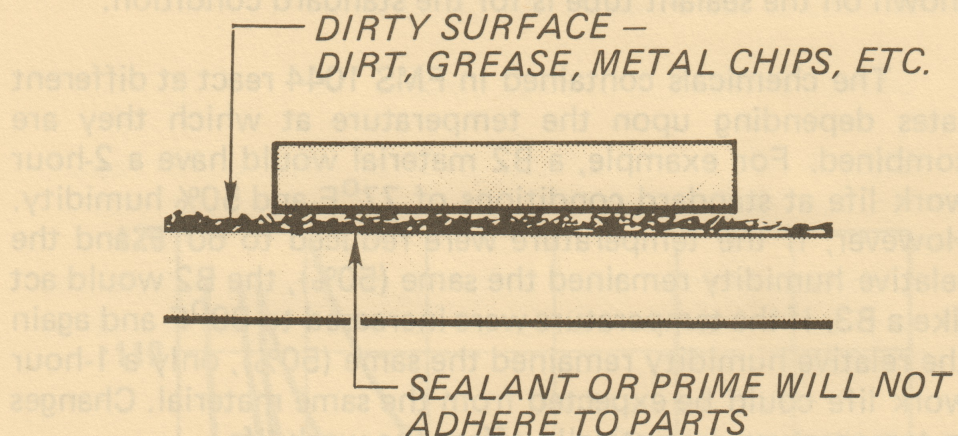
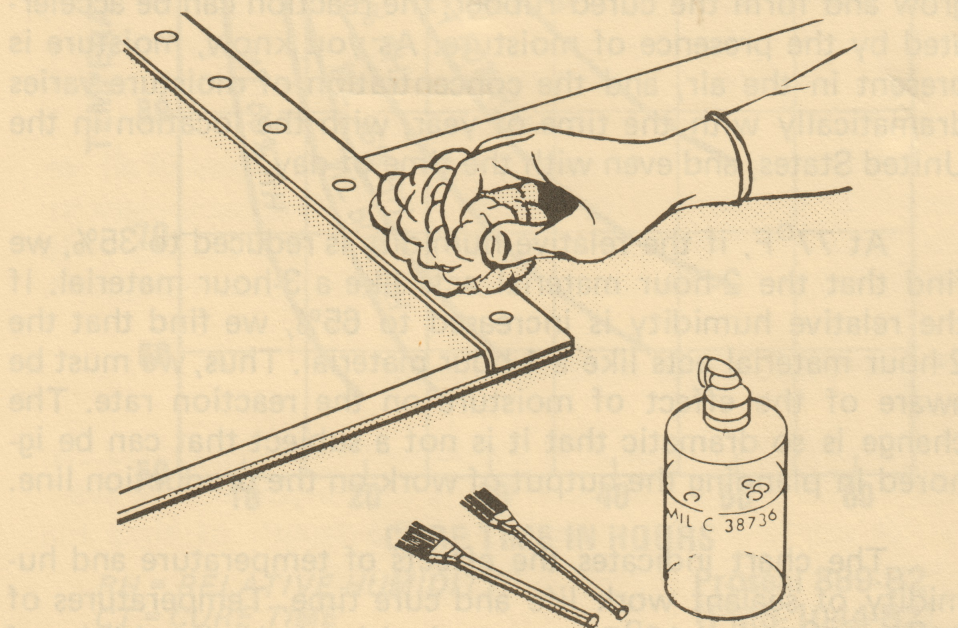


Figure 6 PARTS MUST BE CLEANED BEFORE SEALING



**TO DO A GOOD CLEANING JOB, ALWAYS FOLLOW
INSTRUCTIONS AND USE THE RIGHT MATERIALS**

Figure 7 CLEAN ALL PARTS PROPERLY

SEALANT APPLICATION

We now know something about the material and how it reacts to environmental conditions. Now, where and how do we apply FMS 1044-5 or P6217?

The blueprint will call out the specific locations by part number where sealant is to be applied. The note section of the blueprint will refer to the specification that gives the procedure to be used. FPS 1003 is used for nonfuel areas and FPS 1004 for fuel areas.

Preparation for Cleaning

After all drilling, reaming, countersinking, deburring, and other mechanical operations are completed and the parts are ready for reassembly, the parts and the work area are prepared for cleaning.

You prepare the work for cleaning by removing all dust, chips, etc. from the parts and from the work area with a brush or vacuum cleaner. You then remove loosely adhered paint, primer, marks, layout dye, grease, etc. from the parts with the approved solvent.

Cleaning

Thoroughly clean the surfaces of the parts where sealant is to be applied with a clean P5396 cleaning cloth saturated with the approved solvent. Wipe dry with a clean cheesecloth. **Do not allow the cleaner to evaporate from the surface.**

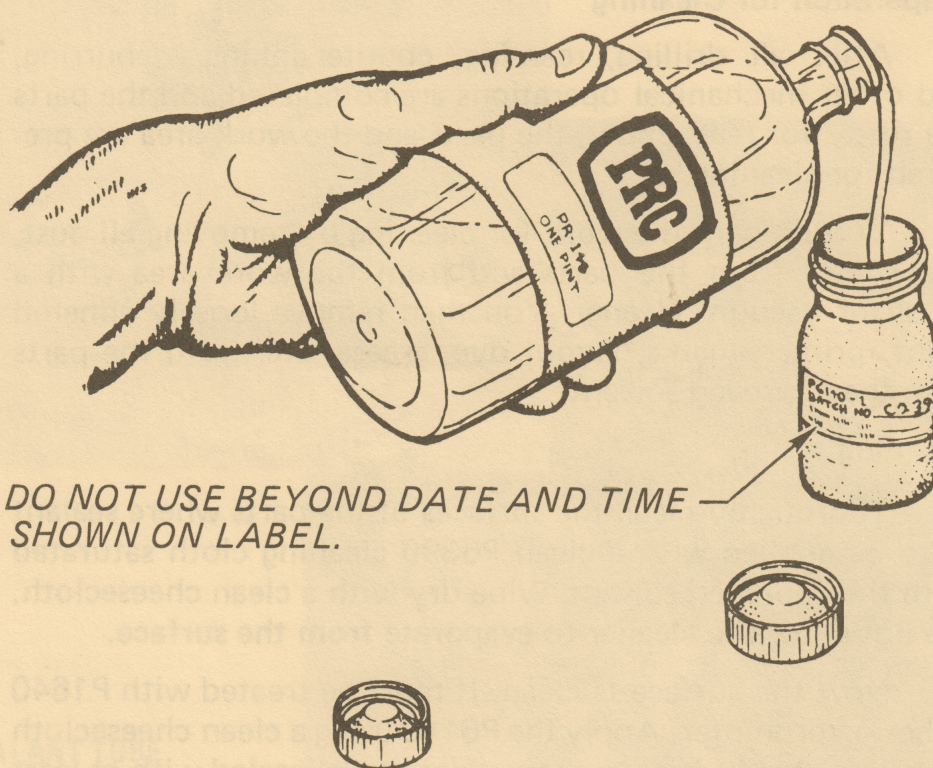
Now the surface is clean. It must be treated with P1640 adhesion promoter. Apply the P6140 using a clean cheesecloth or brush. Apply it onto the surfaces to be sealed with at least a ½-inch wide excess so that when the faying surfaces are assembled, there will be visual confirmation that adhesion promoter has been applied. Allow to air dry for at least 15 minutes but not more than 24 hours before applying sealant.

Both P6140-1 and P6140-2 absorb moisture from the air. Keep containers closed when not in use and do not use beyond the date and time shown on the label. The material must be discarded after a specified time has elapsed since the breaking of the seal (24 hours for P6140-1; 7 days for P6140-2).

CAUTION:

P6140 ADHESION PROMOTER is moisture sensitive and can absorb moisture from the air.

P6140-1 is BLUE. P6140-2 is RED.



DO NOT USE BEYOND DATE AND TIME SHOWN ON LABEL.

NOTE:

DO NOT USE-2 (RED) ON THE F-111.

Figure 8 THE USE OF ADHESION PROMOTER

Sealing Faying Surfaces

To seal faying surfaces, use the sealant specified on the blueprint, such as FMS 1044-5 (B6), and a tool suitable for spreading the sealant over all areas of the faying surfaces. Apply sealant in an amount sufficient to provide a continuous bead of squeezed out sealant along the edges of the flanges after the parts are assembled. Spread the sealant and seal the faying surface grooves (if any) at the same time. Prepack any closed voids by adding sealant in an amount sufficient to fill the voids when the parts are assembled.

Assemble the parts and install set-up bolts. Set-up bolts must be installed and torqued while the faying surface sealant and void sealant still have the ability to flow out of the joint.

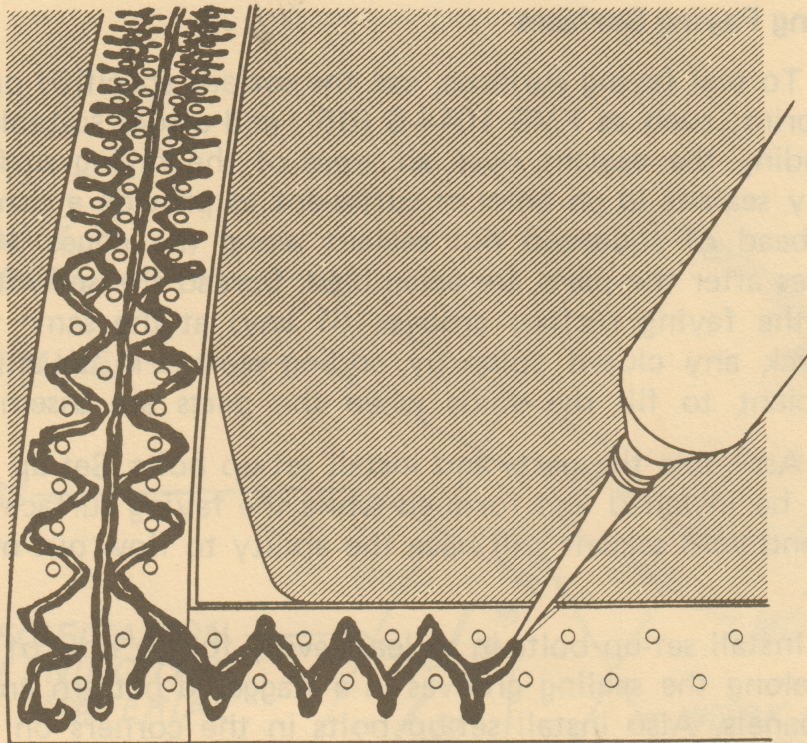
Install set-up bolts in at least every fourth hole of each row along the sealing grooves in a staggered pattern around the panels. Also install set-up bolts in the corners on each side of voids. Install set-up bolts in at least every fourth hole of intermediate flanges.

NOTE: If the final fasteners to be installed are threaded fasteners, they may be used in lieu of the set-up bolts in the spacing noted.

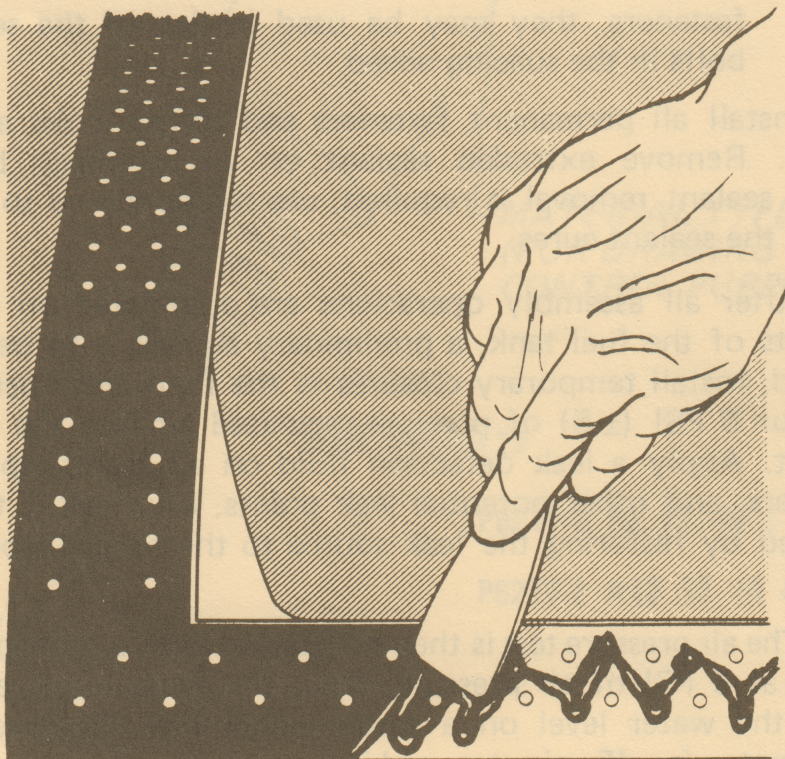
Install all permanent fasteners and torque bolts as required. Remove extruded sealant on an as-you-go basis. Where sealant removal is required, use the approved solvent before the sealant cures.

After all assembly operations are completed on components of the fuel tank, a preliminary air test is to be performed. Install temporary closures in the fuel tank openings and put 5 PSI (± 0.5) of pressure-regulated air into the component. Apply a leak detection fluid on all seams, splices, fasteners, and other potential leak points. Any leak is to be repaired by restoring the leak source to the original specification.

The air pressure test is then completed with a manometer check at 5 PSI of air pressure. Close the pressure valve and mark the water level on a water manometer. Observe the manometer for 45 minutes, and if the water level in the manometer does not change, the component is leak free.



**Figure 9 APPLYING SEALANT TO FAYING SURFACES
AND SEALING OPEN VOIDS**



**Figure 10 SPREADING SEALANT OVER A FAYING
SURFACE**

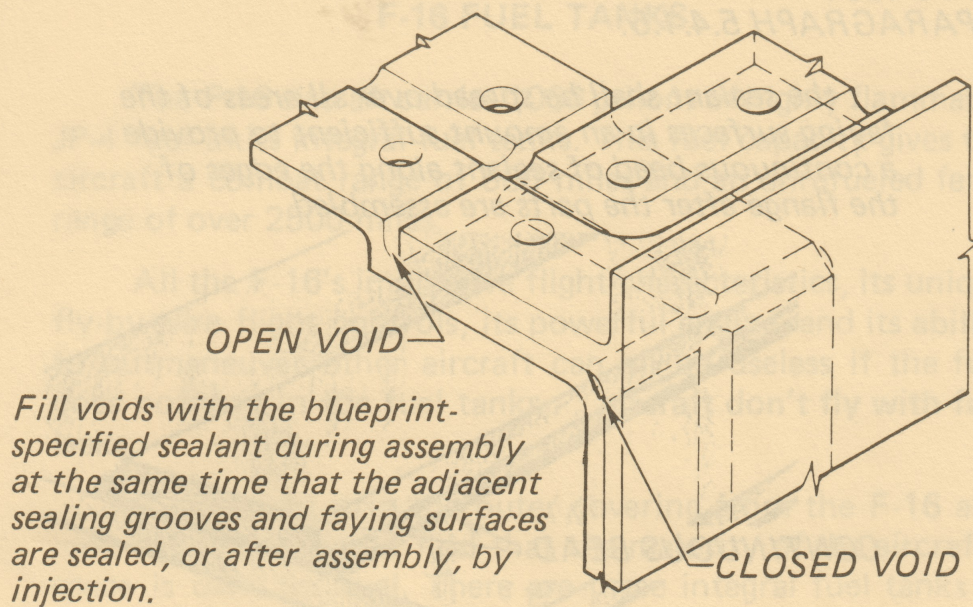


Figure 11 DIFFERENTIATING BETWEEN OPEN VOIDS AND CLOSED VOIDS

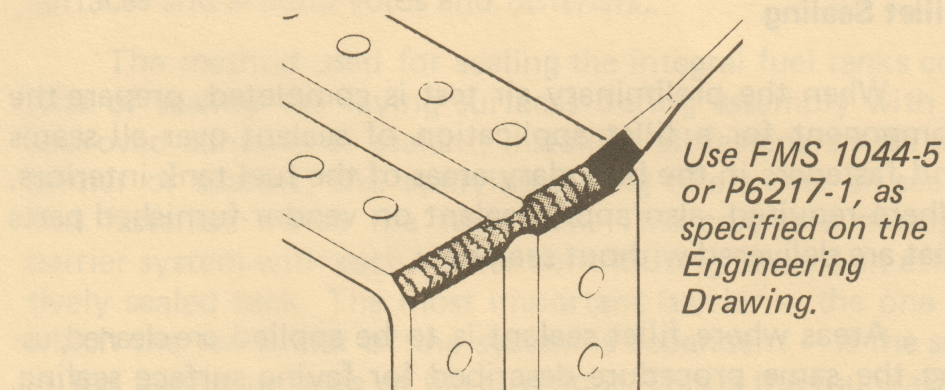


Figure 12 SEALING CLOSED VOIDS DURING THE SEALING OF ADJACENT FAYING SURFACES

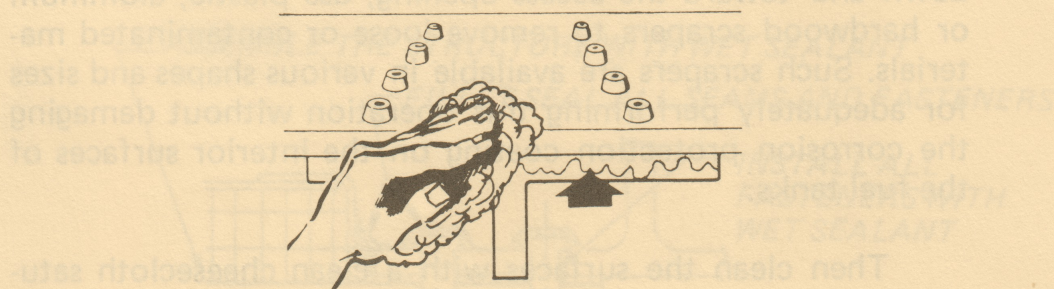


Figure 13 REMOVING EXCESS SEALANT

FPS-1004
PARAGRAPH 5.4.1.5:

... the sealant shall be spread over all areas of the faying surfaces in an amount sufficient to provide a continuous bead of sealant along the edges of the flange after the parts are assembled.

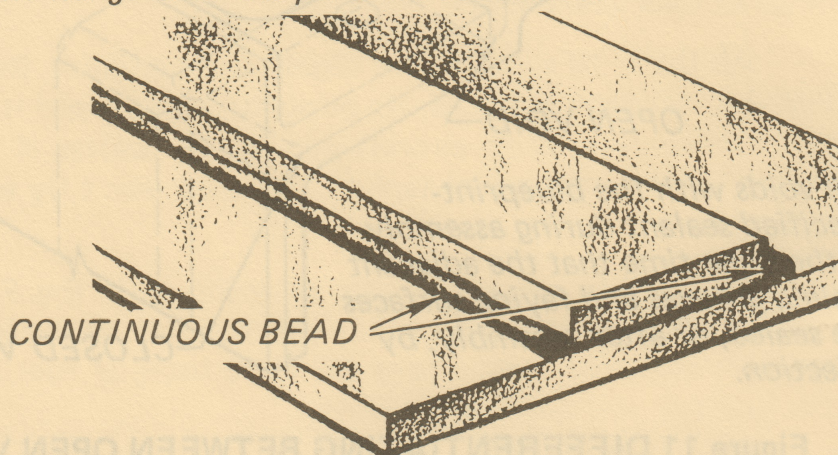


Figure 14 ACCEPTANCE CRITERIA FOR SEALANT SQUEEZE OUT

Fillet Sealing

When the preliminary air test is completed, prepare the component for a fillet application of sealant over all seams and fasteners in the boundary areas of the fuel tank interiors. Where required, also apply sealant on vendor-furnished parts that are delivered without sealant.

Areas where fillet sealant is to be applied are cleaned, using the same procedure described for faying surface sealing, except that additional specific cautions are to be observed.

Beginning at the top of the component and working down and toward the access opening, use plastic, aluminum or hardwood scrapers to remove loose or contaminated materials. Such scrapers are available in various shapes and sizes for adequately performing this operation without damaging the corrosion protection coating on the interior surfaces of the fuel tanks.

Then clean the surfaces with a clean cheesecloth saturated with the approved solvent and wipe them dry with clean cheesecloth while the cleaner is still wet. **Do not allow the cleaner to evaporate.**

Then treat the surface with P6140 adhesion promoter by wiping the surface with a clean cheesecloth wet with P6140. Wipe one-half inch beyond the area to be sealed to assure full coverage yet avoid excess use of the material. Allow the treated surface to **air dry** for 15 minutes but not more than 24 hours before applying sealant.

The application of fillet sealant is made with a sealant filleting gun. Use a tip of suitable size and shape for best directing sealant in a continuous bead and forming a fillet of the desired shape. Large and thick fillets are best laid by moving the tip in a small circular motion and keeping the tip embedded in the sealant. Use a spatula of the desired shape to work out entrapped air and smooth the fillet to the desired shape. The desired shape for each type of application is shown in the following illustrations (and in Figure 2 of FPS 1004).

The recommended dimensions for fillets over fasteners and seams are also shown in the following illustrations and the accompanying table. Adherence to these dimensions is not critical nor mandatory, and the minimum thicknesses given are more important than the maximums. Observation of normal good practice provides adequate sealing and fillet thickness without excessive buildup.

DIM	THICKNESS (IN.)	
	MIN	MAX
A	.05	.09
B	.18	.22
C	.31	.35
D	.10	.14

Figure 15 RECOMMENDED DIMENSIONS FOR FILLETS

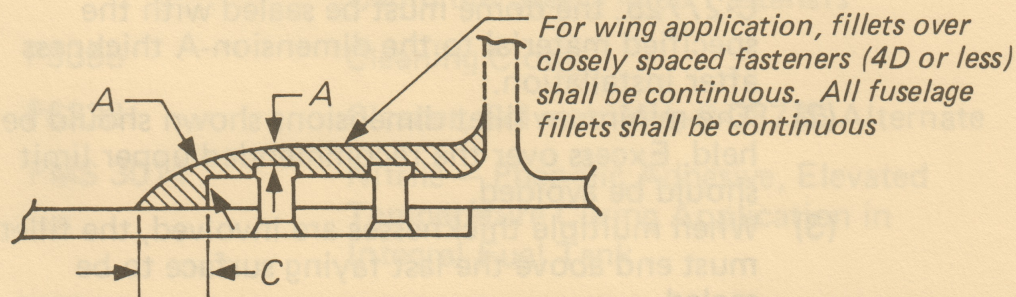
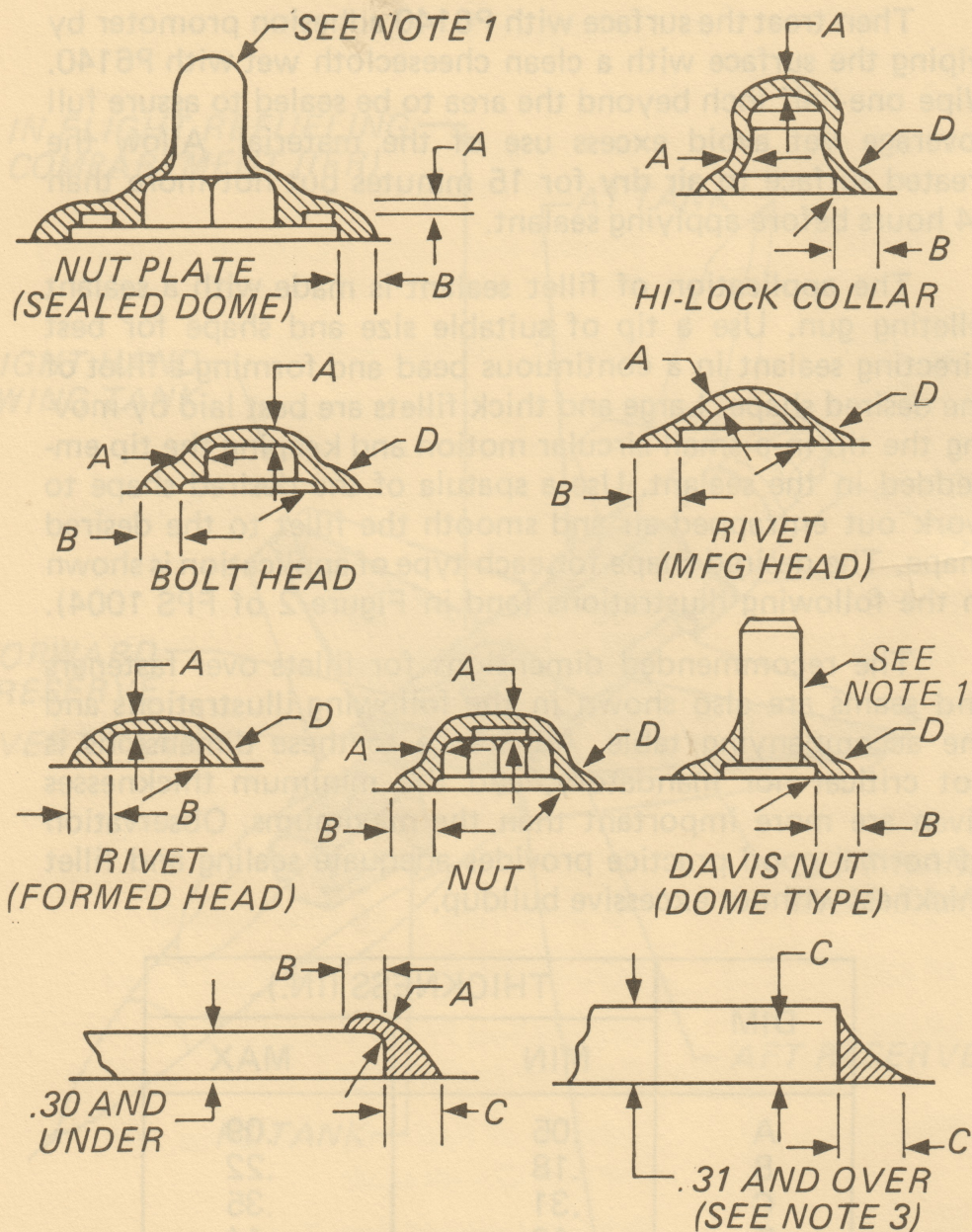


Figure 16 USE OF FILLET SEALANT IS DETERMINED BY NATURE OF WORK PIECE



- NOTES: (1) If the dome of the nut plate is not coated with MIL-L-46010, MIL-L-8937, FMS1058-1 or MIL-C-27725, the dome must be sealed with the specified material to the dimension-A thickness after installation.
- (2) The minimum fillet dimensions shown should be held. Excess over the recommended upper limit should be avoided.
- (3) When multiple thicknesses are involved, the fillet must end above the last faying surface to be sealed.

Figure 16 USE OF FILLET SEALANT IS DETERMINED BY NATURE OF WORK PIECE (Cont'd)

General Fastener Preparation

Fasteners, nut collars, and washers must be clean before they are installed with wet sealant.

Fasteners that receive treatments such as platings and chemical films are considered to be clean at the completion of those processes. These fasteners do not require further cleaning if they are protected from contamination during handling, shipping and storage.

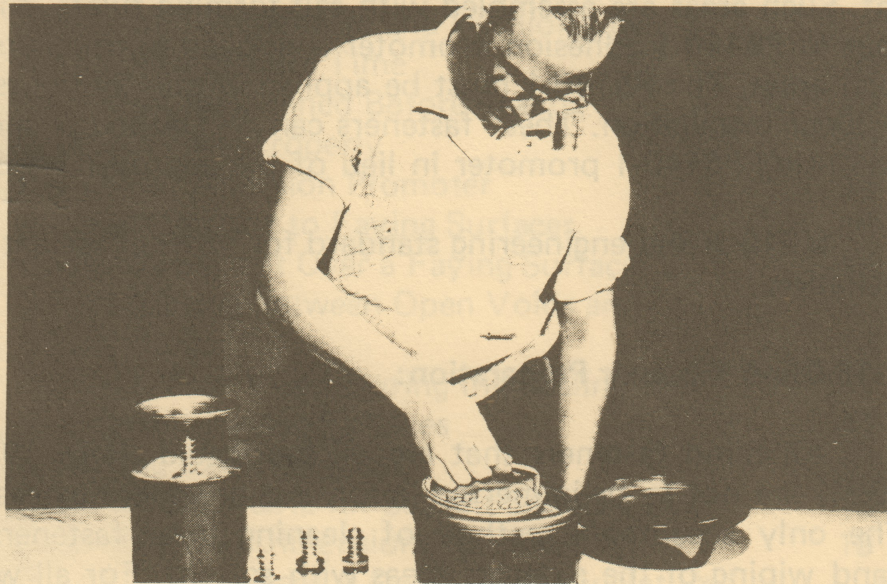


Figure 17 CLEANING FASTENERS

Taper shank fasteners and fasteners that require special lubricant film for proper installation **do not require cleaning**. Procedures for cleaning the fasteners used in the adhesive sealing process are called out on the Engineering Drawing. Other fasteners, including those purchased already cleaned from outside sources, are cleaned according to the in-house cleaning guidelines described below.

Cleaning of large quantities of fasteners may be handled in a metal basket or other container by vapor degreasing or by rinsing in the approved solvent. Use clean dry air to blow fasteners dry after rinsing.

Cleaning of individual fasteners may be accomplished by using a brush or cheesecloth saturated with the approved solvent to clean the shank, threads, and head of the fasteners. Because the **cleaner must not be allowed to evaporate**, wipe the parts dry with clean, dry P5396 cleaning cloth.

Fasteners drawn from stock are to be kept protected until installed. Fasteners that become contaminated or that are withdrawn from protection for more than 12 hours are to be recleaned prior to installation.

Recleaning is not required when cleaned fasteners are stored in clean feed hoppers of automatic riveters, clean storage bins, and clean dispensing trays.

In some fuel tank areas, it is difficult to apply fillet sealant. Such areas are assembled with self-forming fillets, and a coat of P6140-1 adhesion promoter is applied to fasteners in such areas. The P6140-1 must be applied within 24 hours of fastener installation. These fasteners can be cleaned as specified using P6140-1 promoter in lieu of the approved sealant.
solvent

M219 is the engineering standard for fastener sealant installation.

F-16 Blind Fastener Preparation:

All blind fasteners that are oil lubricated (NAS 1919/1921) are **not** to be immersed in solvents or vapor degreased. The only acceptable method of cleaning these fasteners is hand wiping of the external areas with solvent. For all wing applications and fuselage applications which do not receive sealant fillets, the cleaning solvent to use is the approved solvent.

NOTE: When fasteners are cleaned by hand wiping, sealant application and fastener installation may proceed immediately (15-minute wait not required).

Other blind fasteners, which do not receive oil lubricant, are cleaned by slushing in solvent. All fasteners for wing and fuselage applications that receive no fillets are to be cleaned by sloshing in P6140-1 adhesion promoter or 3014 Form 2. In other fuselage applications, the fasteners may be cleaned by sloshing in the approved cleaner or P6140-1 adhesion promoter or by vapor degreasing.

NOTE: When the cleaning solvent is P6140-1 adhesion promoter, fasteners are to be installed within 24 hours of cleaning.

SAFETY PRECAUTIONS

Nearly all of the cleaning and sealing materials are toxic and/or flammable and must be used with caution. The following safety rules apply to all personnel when working with sealants or solvents:

1. Toxic and/or flammable materials are used throughout sealing operations. Avoid excessive breathing of the fumes and wear protective clothing (gloves, goggles, etc.). Comply with applicable plant safety regulations.
2. Pressure testing of fuel tanks involves the minor hazards normally associated with pressurized systems. Observe safety precautions contained in General Dynamics Safe Practice Instruction No. 7 during pressure testing of F-16 fuel tanks.
3. Electrical grounding is required for aircraft assemblies resting on jacks or landing gear before the start of any sealing operations.
4. Ventilation, particularly in enclosed or partially enclosed areas, must be consistent with applicable plant health and safety regulations.
5. Electrical devices (blowers, motors, lights, etc.) used in sealing operations must conform to applicable plant safety regulations.
6. Fire fighting equipment, in working order, should be present in all sealing areas.
7. Cleaning solvent should be kept, in minimum quantities, in specially provided holding racks or cribs apart from the primary work station. Only the amount of solvent actually needed to perform the task should be in the work station proper.
8. Soiled cleaning cloths should be discarded into closed safety cans provided for this purpose.

SAFETY PRECAUTIONS

Nearly all of the cleaning and sealing materials are toxic and/or flammable and must be used with caution. The following safety rules apply to all personnel when working with sealants or solvents:

1. Toxic and/or flammable materials are used throughout sealing operations. Avoid excessive breathing of the fumes and wear protective clothing (gloves, goggles, etc.)



**Figure 18 DISPOSE OF USED CLEANING CLOTHS ONLY
IN CONTAINER MARKED "RAG BARREL"**

8. Soiled cleaning cloths should be discarded into closed safety cans provided for this purpose.

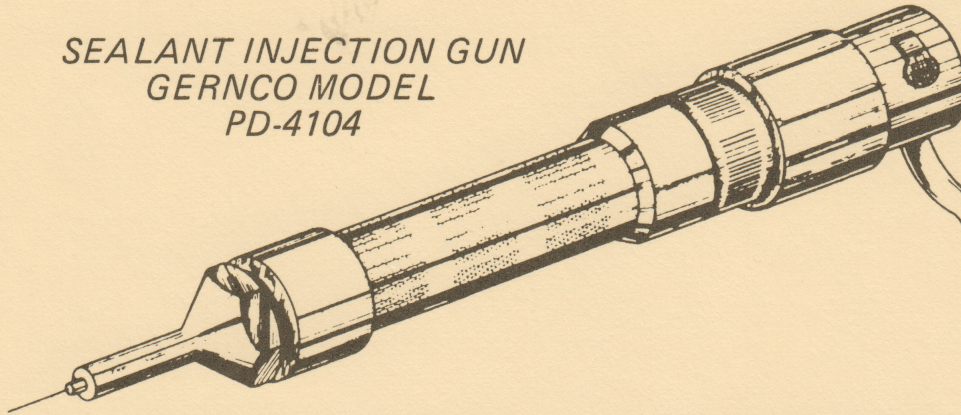
DEFINITIONS OF TERMS

<u>Term</u>	<u>Definition</u>
Application Time or Work Life	The length of time that sealant can be used after it is mixed.
Boundary Structure	The basic structure is a fuel tank that forms the tank boundaries.
Bubble Fluid	The fluid applied to the exterior of a pressurized fuel tank at all potential leak points such as seams, fasteners, and voids to aid in detecting leaks.
Cured Sealant	Sealant that is firm and rubbery to touch.
Fastener	The rivets, bolts, nuts, nutplates, etc. used in the fabrication of fuel tanks.
Faying Surface	The common surface formed by mating parts.
Fillet	The sealant applied along the edges of faying surfaces and fasteners.
Filleting Gun	A continuous flow, low-pressure gun used to apply sealant (SEMCO Model 250-06 or equivalent equipment).
Final Air Test	A test identical to the preliminary air test, except that the fuel tanks are complete.
General Cleaner	A mixture of solvents conforming to MIL-C-38736 for use in most cleaning operations.
Integral Fuel Tank	A compartment formed by the airframe structure and designed to contain fuel.
Intermediate Structure	Structure that is inside the fuel tank and completely immersed in fuel.

DEFINITIONS OF TERMS(Cont'd)

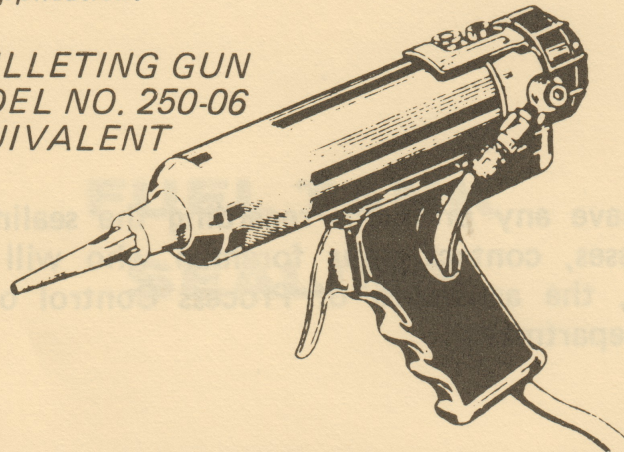
<u>Term</u>	<u>Definition</u>
Permanent Fasteners	The fasteners that are called out on blue-prints and that remain in the structure.
Preliminary Air Test	A leak check on the external surfaces with a bubble fluid before fillets are applied on the tank interior.
Pressure Drop Test	Air pressurization of the tank to 5 PSI to be held for 45 minutes with air supply turned off. A pressure drop indicates a leak.
Sealing Grooves	Grooves machined in the structure to permit entrapment of sealant.
Set-Up Bolts	Temporary fasteners that are installed to clamp surfaces together until permanent fasteners can be installed.
Torquing Fastener	Tightening threaded fasteners to a specified torque value to assure proper clamping.
Retorquing Fasteners	Tightening the fasteners again (two or more times) 30 minutes after installation to take out any looseness caused by sealant flowing out of a joint.
Void	A hole or space within or through a structure formed by the assembly of parts.
Open Void	A void which is exposed and accessible at some stage during assembly.
Closed Void	A void which is created when the structure is completely assembled.

SEALANT INJECTION GUN
GERNCO MODEL
PD-4104

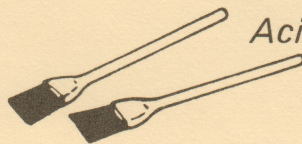


A high-pressure, trigger-controlled one-shot gun used to fill voids where injection is specified. The type and size of the tip used depends upon the particular application.

SEALANT FILLETING GUN
SEMCO MODEL NO. 250-06
OR EQUIVALENT



A low-pressure, constant flow gun which is used in most applications of sealant to fill external grooves and to apply sealant to faying surfaces.



Acid Brushes

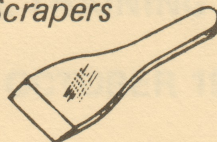


Spatulas

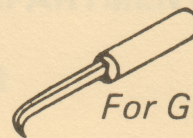
Spatulas are used to spread sealant over faying surfaces after a bead of sealant has been applied with a filleting gun. Only approved spatulas should be used — they must be smooth and free of sharp edges.

Aluminum and Plastic Scrapers

For Flat Surfaces



For Grooves

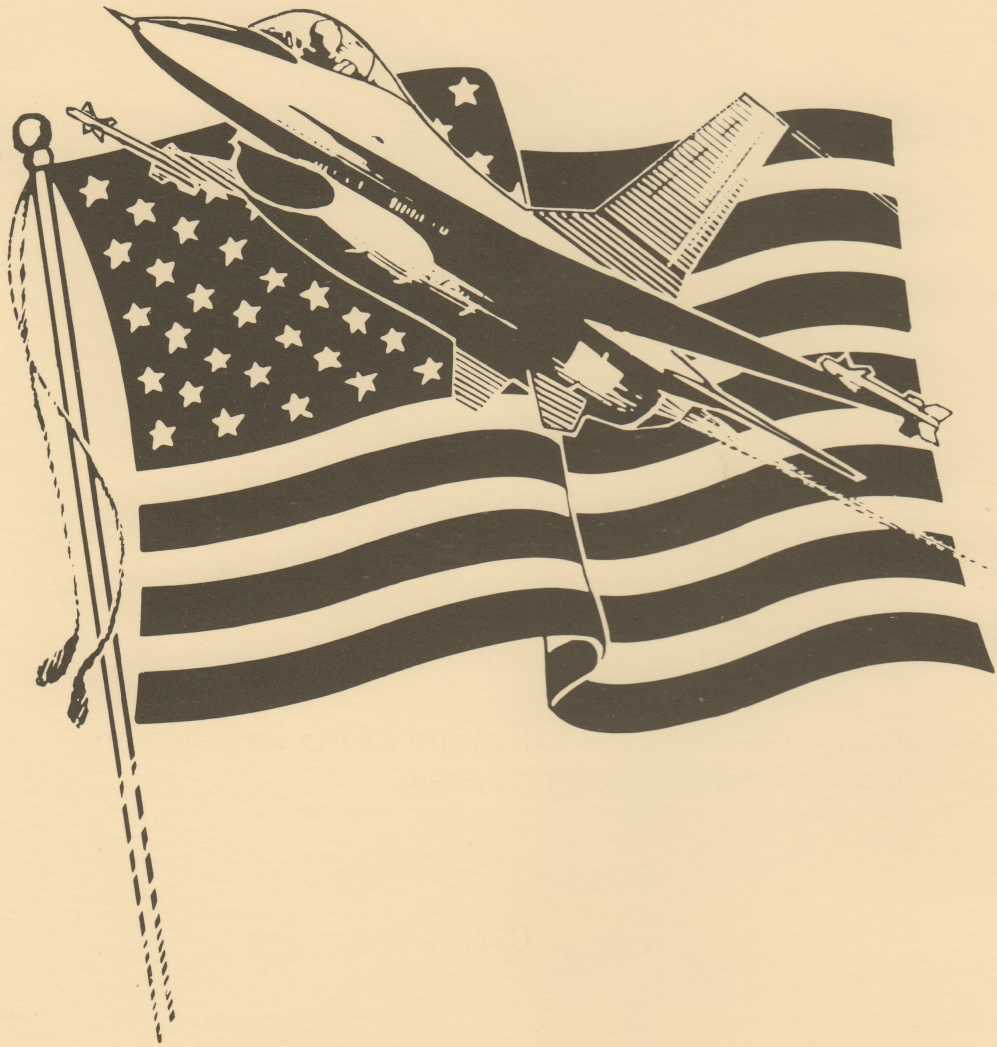


Aluminum or plastic scrapers are used to remove excess cured sealant from areas such as external grooves and the edges of faying surfaces. They are also used to remove cured sealant from areas to be resealed.

Figure 19 EQUIPMENT USED IN SEALING FUEL TANKS

NOTE:

If you have any problems regarding the sealing materials or processes, contact your foreman who will request, if necessary, the assistance of Process Control or the Engineering Department.



We have an obligation to our company and to our customers to furnish the best and most modern equipment possible. Let's not let them down.

FPS 100

FPS 100 3 NON FUEL ARE

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